Patent Application of

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for

SLOPE COMPENSATING TREE STAND

CROSS-REFERENCES TO RELATED APPLICATIONS

Not Applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable.

MICROFICHE APPENDIX

Not Applicable

BACKGROUND OF THE INVENTION

1. Field of the Invention.

This invention relates to the field of tree stands. More specifically, the invention comprises a tree stand incorporating adjustment features allowing it to assume a level attitude when attached to a sloping object.

2. Description of the Related Art.

Tree stands have been in common use for many years. Some of these stands are made as a separate footrest assembly and seat assembly. These two separate assemblies can then be progressively moved up the trunk of a tree to "climb" the stand into position. One such prior art climbing stand is shown in U.S. Patent No. 5,996,738 to Nelsen (1999). Figures 2A and 2B of the Nelsen disclosure illustrate the conventional use of a climbing tree stand. The Nelsen disclosure is hereby incorporated by reference.

The Nelsen disclosure also illustrates a conventional method for affixing the stand components to a tree trunk. Nelsen's Figure 1 shows how each assembly includes a horizontal platform butted against the tree. A loop (element (6) in the view) is then passed around the tree at an acute angle to the horizontal platform. Those skilled in the art will realize that weight placed on the horizontal platform will tend to lock the assembly to the tree. By the same token, if the horizontal platform is lifted upward, the assembly can freely slide up the trunk. Thus, a user standing on the lower platform can use his or her arms to push the upper platform upward. The user can then grasp the upper platform, hook his or her feet in the lower platform, and pull the lower platform upward. These cycles are repeated to work the two platforms up the tree.

The loop around the tree (element (6)) must be substantially inelastic. If the tree diameter changes, the length of the loop must be adjusted in order to keep the platform horizontal. Of course, the diameter of most trees tapers going upward. It is generally impractical to constantly adjust the length of the loops while climbing. The platforms may therefore tend to pitch downward as the tree is climbed.

BRIEF SUMMARY OF THE PRESENT INVENTION

The present invention comprises a tree stand with adjusting features allowing it to remain level in use. The invention includes two main subassemblies - a lower foot platform and an upper seat platform. The foot platform features a pivotally attached foot rest portion which can be adjusted in pitch. The seat platform includes a rotating seat with a pitch pivot located underneath. The seat's pitch is infinitely adjustable without affecting its rotation about the yaw axis. The seat platform also includes two telescoping climbing arms which the user can grasp when moving the two platforms up a tree. These climbing arms can be stowed once the stand is in position for use.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. 1 is an exploded perspective view, showing the foot platform.

FIG. 2 is a perspective view, showing the foot platform in an assembled state.

FIG. 3 is a perspective view, showing the foot platform attached to a tree.

FIG. 4 is a detail view, showing the pivoting foot rest.

FIG. 5 is an exploded perspective view, showing the chair platform.

FIG. 6 is a perspective view, showing the chair platform in an assembled state.

FIG. 7 is a perspective view, showing the chair platform from underneath.

FIG. 8 is a detail view, showing the pitch adjustment mechanism of the seat.

FIG. 9 is a perspective view, showing the foot platform and chair platform attached to a tree.

FIG. 10 is a perspective view, showing how the two climbing arms can be stowed.

FIG. 11 is a perspective view, showing the two platforms in position on a tree.

FIG. 12 is a perspective view, showing the pitch adjustment of the seat.

FIG. 13 is a perspective view, showing the stand in a pitch-adjusted configuration and ready for use.

REFERENCE NUMERALS IN THE DRAWINGS

10	foot platform	12	foot platform frame
14	pivot joint	16	foot rest
18	cable guide	20	tube end
24	pivot tube	26	strut
28	fixed eye	30	lower cable
32	serrated plate	34	tree
36	adjustment plate	38	adjustment hole
40	locking pin	42	seat platform frame
44	hollow receiver	46	climbing arm
48	toe loop	50	seat tube

52	seat platform	54	upper cable
56	pitch pivot	58	yaw pivot
60	seat	62	rod anchor
64	pitch rod	66	pitch wheel
68	threaded hole	70	swivel block
72	swivel block pin	74	swivel block mount
80	toe loop		

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows foot platform **10** in an exploded view. Foot platform frame **12** is intended to remain approximately horizontal. It is formed from a series of tubes welded together to form a space frame. One side of the frame is designed to bear against a tree trunk. This side features arc **48**, which is an arcuate piece of tubing having a diameter which is preferably larger than the diameter of a typical tree trunk. Two serrated plates **32** are mounted on arc **48** facing the tree. These frictionally engage the tree trunk to hold the foot platform in position.

Two tube ends **20** flank arc **48**. A pivot tube **24** slides over and rotatably mounts on each tube end **20**. Each pivot tube **24** is connected to a cable guide **18** by a strut **26**. Each pivot tube **24**, strut **26**, and cable guide **18** are rigidly locked together, so that they rotate in unison about a tube end **20**.

Foot rest **16** is pivotally attached to foot platform frame **12** on the opposite side from arc **48**. Foot rest **16** can be pivotally adjusted with respect to foot platform frame **12**. FIG. 2 shows foot platform **10** in an assembled state. Each cable guide **18** has been attached by placing its respective

pivot tube **24** over the respective tube end **20**. These can be retained in place by a mechanical stop or similar device. Lower cable **30** is passed through the hollow interior of both cable guides **18** to form a loop lying above arc **48**. The two free ends of the cable are attached to foot platform frame **12** near the point where foot rest **16** is attached. One or both of the cable attachments are made removable so that the device can be removed from a tree. One or more of the cable attachments is also made adjustable so that the overall length of the cable can be adjusted.

FIG. 3 shows foot platform **10** attached to tree **34**. The reader will observe how lower cable **30** is passed around the tree's trunk. The weight of the foot platform causes the two serrated plates **32** to bear against the tree and hold the assembly in position. Those skilled in the art will know that additional weight placed on foot platform frame **12** (such as by the user standing on it) will serve to increase the normal force against the tree produced by the two serrated plates. However, those skilled in the art will also know if a user lifts up the foot platform, it will be free to slide up the tree trunk.

Still looking at FIG. 3, the advantage of pivotally mounting the two cable guides to the foot platform will be explained. The platform must be able to function with trees of varying diameter. The total length of the cable can be adjusted for this purpose, so that it forms a larger or smaller loop. In the case of a smaller loop, the two struts will pivot inward to position the two cable guides further inward. This repositioning prevents the cable tension from placing a large inward force on the top of the struts, which might bend them. Thus, the combination of the pivoting cable guide assemblies and the adjustable length of the cable allows the user to apply the foot platform to trees having different diameters.

FIG. 4 is a detail view of foot rest **16** and the features attaching it to foot platform frame **12**. Foot rest **16** is pivotally attached to the foot platform frame by a pair of pivot joints **14**. These pivot joints allow the pitch of the foot rest to be adjusted with respect to the pitch of the foot platform frame. A pair of adjustment plates **36** are provided, with one plate being located on each side of the foot platform frame proximate a pivot joint **14**. Each adjustment plate **36** includes a series of adjustment holes **38** located along an arc.

A locking pin **40** can be passed through a desired hole and underneath foot rest **16** to support it at a desired pitch. The locking pin can be equipped with a ball detent or other retaining feature so that it does not accidentally slip out of an adjustment hole. It can also be tied to the foot platform by a small flexible cable so that it will not be lost. A locking pin is preferably provided for both sides of the foot rest. Thus, by placing the locking pins in the appropriate adjustment holes, the user can set the pitch of the foot rest.

FIG. 5 shows an exploded view of seat platform **52**. Its structure is generally similar to the foot platform. Seat platform frame **42** is composed of tubes welded together. Like the foot platform frame, it includes an arc **48** with serrated plates **32**. These features are positioned to bear against the tree. Two cable guides, with associated struts **26** and pivot tubes **24** are pivotally attached to seat platform frame **42**.

Seat tube **50** is located near the end of the seat platform which is furthest from the tree. It mounts an adjustable seat, which will be described subsequently. The two tubes defining the sides of the seat platform frames each end in a hollow receiver **44** which is sized to receive a climbing arm **46**. These two climbing arms **46** slide out of the hollow receivers to an extended position. They are prevented from coming all the way out of the seat platform frame by mechanical stops.

FIG. 6 shows seat platform **52** in an assembled state, with the two climbing arms **46** in the extended position. The two cable guides **18** are pivotally attached to the side of the seat platform frame facing the tree. Upper cable **54** is installed through the hollow interiors of the two cable guides and adjustably attached to the seat platform frame. As for the foot platform, the length of the upper cable is made adjustable to accommodate different tree diameters.

FIG. 7 shows the same assembly from underneath. The reader will observe that seat **60** has been attached to seat tube **50**. It is actually attached through two rotational joints - yaw pivot **58** and pitch pivot **56**. Yaw pivot **58** allows the seat to swivel freely about the yaw axis. Pitch pivot **56** allows the pitch of the seat to be adjusted with respect to the seat platform frame.

The pitch is adjusted by turning pitch wheel **66**. The user can perform this adjustment while seated. Pitch rod **64** is a long threaded rod. The end of the rod nearest the tree is rotatably mounted to rod anchor **62**. Rod anchor **62** allows the end of the pitch rod it contains to turn freely, but not to move in or out of the rod anchor.

FIG. 8 shows pitch pivot **56** in more detail. Swivel block **70** is pivotally mounted by two swivel block pins **72** to the two swivel block mounts **74** (one on either side of the pitch wheel). This feature allows the swivel block to pivot with respect to the two swivel block mounts. The reader will observe that the two swivel block mounts **74** are rigidly connected to pitch pivot **56**.

Threaded hole **68** passes through the center of swivel block **70**. This thread is designed to engage the external threads on threaded rod **68**. Those skilled in the art will thereby realize that if the user turns the pitch wheel in a clockwise direction swivel block **70** will be forced further away from rod anchor **62**, with the result that pitch pivot **56** will pitch the seat upward. If the user turns the pitch wheel in a counterclockwise direction, the swivel block will be forced closer to the rod

anchor and the pitch pivot will pitch the seat downward. Thus, by turning the pitch wheel, the user can set the pitch of the seat with respect to the seat platform frame. Once the user stops turning the pitch wheel, the chair will tend to remain in the pitch set without requiring a supplemental locking means.

The operation of the invention will now be described in detail. FIG. 9 shows the invention installed on tree **34**. Foot platform **10** is attached via the lower cable and seat platform **52** is attached via the upper cable. The two climbing arms **46** are shown in the extended position - ready for climbing. The user stands on the foot platform with his or her body being located between the two climbing arms. The user then lifts the seat platform up a foot or so, where it again grabs the tree and comes to rest.

Next, the user hooks his or her toes under toe loop **48** while grasping the two climbing arms. The user then pulls the foot platform up a foot or two, where it grabs the tree and comes to rest. The user is then ready to push the seat platform up another step, whereupon the cycle repeats. Many types of toe loop devices are known. The one depicted is merely a simplified representation. Those skilled in the art will know that the toe loop is merely a convenience. Some users may simply hook their feet under the frame itself to pull up the foot platform.

The steps described are repeated until the stand has reached a desired height on the tree. The diameter of the tree has generally tapered somewhat by this point. FIG. 10 shows the result. The user generally does not have time to continually adjust the cable lengths while climbing the tree. Thus, by the time the stand is suspended high off the ground, the cable lengths are too long to keep the platforms horizontal. By this point they will slope downward as shown in FIG. 10.

The user therefore needs to adjust the stand for use. First, the user pushes the two climbing arms **46** back into the two hollow receivers. Mechanical detents can be provided to keep the climbing arms in this position. If a fairly close fit is used, friction alone will be sufficient to hold them in position. With the climbing arms stowed, the user can then sit on the seat. However, as shown, the user will be uncomfortably pitched forward.

In FIG. 11, the user has adjusted the pitch of foot rest **16** upward and locked it in position. In FIG. 12, the user begins turning pitch wheel **66** in a clockwise position in order to pitch seat **60** upward with respect to the seat frame. FIG. 13 shows the seat after the pitch has been adjusted to the horizontal. The stand is now ready to use. The hunter can swivel on seat **60** while maintaining his or her feet braced against foot rest **16**.

Although the preceding description contains significant detail, it should not be viewed as limiting the invention but rather as providing examples of the preferred embodiments. Accordingly, the scope of the invention should be fixed by the following claims rather than by any examples given.